CLAIMS

What is claimed is:

1. A communications network, comprising:

a communications medium carrying a synchronous communications transport signal including a plurality of time-division-multiplexed (TDM) channels;

at least three bridges, each bridge having an interface to an associated one of a plurality of local area network (LAN) segments; and

a plurality of add-drop circuits, each add-drop circuit being associated with a corresponding different one of the bridges and coupling the associated bridge to the communications medium, each add-drop circuit being operative to (i) group a plurality of the TDM channels of the communications transport signal into a bundle, (ii) schedule the use of the bundle to carry data traffic originated by the associated bridge and to carry data traffic originated by the other bridges, (iii) in accordance with the scheduling, transmit data traffic originated by the associated bridge and destined for the other bridges on the bundle, (iv) receive data traffic from the other bridges via the bundle, (v) determine whether the received data traffic from the other bridges is destined for the associated bridge, and if so then forward such received data traffic to the associated bridge, and (vi) if the received data traffic is destined for one of the other bridges, then, in accordance with the scheduling, re-transmit such received data traffic on the bundle for receipt by the add-drop circuit associated with the destination bridge.

2. A communications network as in claim 1, wherein each add-drop circuit is operative when scheduling of the use of the bundle to (i) maintain a scheduling table including an internal slot and an

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external slot, the internal slot containing information indicating the amount of data that can be transmitted by the associated bridge during a scheduling interval, the external slot containing information indicating the amount of data that can be forwarded on behalf of the other bridges during the scheduling interval, and (ii) during the scheduling interval, limit the amount of data transmitted by the associated bridge and by the other bridges in accordance with the information in the internal and external slots.

3. A communications network as in claim 1, wherein the bridges are members of a first bridge group, and further comprising additional bridges being members of a second bridge group, each bridge of the second bridge group having an interface to an associated one of additional LAN segments, and wherein the communications transport signal includes a plurality of additional TDM channels, and wherein each add-drop circuit is further operative to (i) couple the associated bridge of the second bridge group to the communications medium, (ii) group the additional TDM channels of the communications transport signal into an additional bundle, (iii) schedule the use of the additional bundle to carry data traffic originated by the associated bridge of the second bridge group and to carry data traffic originated by the other bridges of the second bridge group, (iv) in accordance with the scheduling, transmit data traffic originated by the associated bridge of the second bridge group and destined for the other bridges of the second bridge group on the additional bundle, (v) receive data traffic from the other bridges of the second bridge group via the additional bundle, (vi) determine whether the received data traffic from the other bridges of the second bridge group is destined for the associated bridge of the second bridge group, and if so then forward such received data traffic to the associated bridge of the second bridge group, and (vii) if the received data traffic

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is destined for one of the other bridges of the second bridge group, then, in accordance with the scheduling, re-transmit such received data traffic on the additional bundle for receipt by the add-drop circuit associated with the destination bridge.

4. A communications network as in claim 1, wherein the TDM channels of the communications transport signal have equal data-carrying capacities.

5. A communications network as in claim 4, wherein the number of TDM channels included in the communications transport signal is 28.

6. A communications network as in claim 1, wherein each LAN segment employs a shared electrical medium.

7. A communications network as in claim 1, wherein the communications medium is an optical medium.

8. A network communications device, comprising:

an interface to a communications medium carrying a synchronous communications transport signal including a plurality of time-division-multiplexed (TDM) channels;

a local bridge having an interface to a local area network (LAN) segment; and

an add-drop circuit coupling the local bridge to the communications medium, the add-drop circuit being operative to (i) group a plurality of the TDM channels of the communications transport signal into a bundle, (ii) schedule the use of the bundle to carry data traffic originated by the local bridge and to carry data traffic originated by other bridges coupled to the communications medium by other add-drop circuits, (iii) in accordance with the scheduling, transmit data traffic originated by the local bridge and destined for the other bridges on the

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bundle, (iv) receive data traffic from the other bridges via the bundle, (v) determine whether the received data traffic from the other bridges is destined for the local bridge, and if so then forward such received data traffic to the local bridge, and (vi) if the received data traffic is destined for one of the other bridges, then, in accordance with the scheduling, re-transmit such received data traffic on the bundle for receipt by the add-drop circuit associated with the destination bridge.

9. A network communications device as in claim 8, wherein the add-drop circuit is operative when scheduling of the use of the bundle to (i) maintain a scheduling table including an internal slot and an external slot, the internal slot containing information indicating the amount of data that can be transmitted by the local bridge during a scheduling interval, the external slot containing information indicating the amount of data that can be forwarded on behalf of the other bridges during the scheduling interval, and (ii) during the scheduling interval, limit the amount of data transmitted by the local bridge and by the other bridges in accordance with the information in the internal and external slots.

10. A network communications device as in claim 8, wherein the local bridge is a member of a first bridge group, and further comprising an additional local bridge being a member of a second bridge group, the additional local bridge having an interface to an additional LAN segment, and wherein the communications transport signal includes a plurality of additional TDM channels, and wherein the add-drop circuit is further operative to (i) couple the additional local bridge to the communications medium, (ii) group the additional TDM channels of the communications transport signal into an additional bundle, (iii) schedule the use of the additional bundle to carry data traffic originated by the additional local bridge and to carry

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data traffic originated by additional other bridges of the second bridge group, (iv) in accordance with the scheduling, transmit data traffic originated by the additional local bridge and destined for the other bridges of the second bridge group on the additional bundle, (v) receive data traffic from the other bridges of the second bridge group via the additional bundle, (vi) determine whether the received data traffic from the other bridges of the second bridge group is destined for the additional local bridge, and if so then forward such received data traffic to the additional local bridge, and (vii) if the received data traffic is destined for one of the other bridges of the second bridge group, then, in accordance with the scheduling, re-transmit such received data traffic on the additional bundle for receipt by the add-drop circuit associated with the destination bridge.

11. A network communications device as in claim 8, wherein the TDM channels of the communications transport signal have equal data-carrying capacities.

12. A network communications device as in claim 11, wherein the number of TDM channels included in the communications transport signal is 28.

13. A network communications device as in claim 8, wherein each LAN segment employs a shared electrical medium.

14. A network communications device as in claim 8, wherein the communications medium is an optical medium.

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